Visible Learning: Educational Innovation for Shaping 21st Century Thai Teachers

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Abstract

This study examines how model schools in the "Thai Teachers for Students in the 21st Century" initiative use John Hattie's Visible Learning framework. Visible learning emphasizes evidence-based teacher methods that improve learning outcomes through transparency and quantifiable progress. The research emphasizes the fundamental components of visible learning, such as effective feedback, explicit instruction, student self-evaluation, and well-defined learning objectives. Thai educational institutions have integrated these components through teacher professional development, action research, and Professional Learning Communities.
The study's three main objectives are to (1) learn from model schools that use visible learning, (2) design a training program to improve Thai teachers' educational management, and (3) create 21st-century model schools that use student-centered   learning.
The investigation examined how visible learning enhanced student engagement, analytical thinking, and educational equity, with a specific focus on its impact on teaching and learning in the five southern border provinces of Thailand.
The findings indicate that visible learning improves academic performance, promotes teacher collaboration, and reduces educational inequalities.
The teacher training program demonstrated impressive participant satisfaction, accompanied by notable enhancements in knowledge and teaching methodologies. The study concludes with suggestions for the Ministry of Education, school leaders, and policymakers to more extensively incorporate visible learning into the Thai education system to equip students for the challenges of the 21st century.

Keywords: Visible Learning, John Hattie, Professional Learning Communities, teacher development, 21st-century education, Thailand

Introduction
Visible Learning has been designated by several words in Thai, including "explicit learning processes," "adaptive learning," "evident learning," "connected and visible learning," and "observable learning," among others. This research will utilize the phrase Visible Learning, which, when translated directly into Thai, signifies "learning that is observable or tangible."

Professor John Hattie, an educational authority from the University of Auckland in New Zealand, completed a comprehensive research study over 15 years that established the basis for the Visible Learning concept. Hattie established a framework for effective pedagogical practices that yield outstanding learning outcomes by combining over 50,000 foreign educational studies. The necessity of providing students with impactful learning experiences that they can employ to their daily lives is emphasized by the Visible Learning concept (Hattie, 2009). It encourages the growth of self-regulation, adaptability, and critical awareness of societal changes in a variety of

Natcha Mahapoonyanont , Wipapan Phinla, Wipada Phinla,
Tharadeth Mahapoonyanont, Khanitta Jeerarat

ways.

Educators are essential to the educational framework, as they are the primary source of interaction with students, assisting them in the acquisition of knowledge and simultaneously transitioning to new concepts and objectives. Educators can get and apply ways to enhance their students' learning outcomes. The core principle of Visible Learning entails shifting the classroom emphasis from solely the "teacher" and "student" interaction. Although we may not consistently observe each student's learning strategies, children can express their involvement in their educational processes.

When educators comprehend students' cognitive processes, they can modify their instructional strategies to observe significant improvements in student learning and performance. Visible Learning not only identifies effective teaching practices but also fosters student learning in optimal ways. Studies indicate that pupils exhibit the greatest learning advancement as they advance through the educational system (Hattie & Timperley, 2007; Hattie, 2009, 2012, 2015; Mahapoonyanont, 2017, 2019, 2020, 2022). Visible Learning also substantially advantages school administrators. The essence of Visible Learning transpires in classrooms between educators and learners, thereby benefiting the entire school ecosystem. Educational institutions allocate time and resources to frameworks including class sizes, school duration, recess intervals, and student-to-teacher ratios. When school administrators promote the integration of Visible Learning into instructors' daily and long-term plans, pupils experience improved learning processes and heightened academic accomplishment. The core principle of Visible Learning empowers educators, augmenting their roles and allowing school administrators to concurrently elevate student performance and the experiences of both students and teachers (Hattie & Timperley, 2007; Hattie, 2009, 2012, 2015; Mahapoonyanont, 2017, 2019, 2020, 2022). The researcher anticipates that improving educational quality via the professional development of teachers in applying Visible Learning principles will enhance students' academic performance. Professional learning communities enable instructors to enhance their ability to facilitate learning that addresses the demands of the 21st century and equips students to become global citizens. The major objective is for students to attain academic achievement and cultivate the requisite traits in accordance with 21st-century learning methodologies and the policies of the Ministry of Education. These methodologies emphasize learner-centered instruction that cultivates essential cognitive skills vital for the advancement of Thai students, including critical thinking, evaluation, analysis, synthesis, creativity, and imagination, all of which are imperative for 21st-century learners (Sinlarat, 2014; 2016). This research project seeks to integrate Visible Learning with the formation of teacher professional learning communities (PLCs) as a strategy for facilitating teacher reform and enhancing student development, resulting in elevated educational quality at the local level. This involves improving instructors' instructional competencies and elevating student performance while fostering 21st-century learning skills. Furthermore, the project's extensive influence will establish model schools that function as educational centers within the local community. When proficient lead teachers at exemplary schools arise, they can disseminate 21st-century learning management competencies to adjacent schools, so enhancing the quality of basic education in Songkhla Province. This corresponds with educational reform strategies and improves local educational quality, in accordance with national educational objectives.

This research project aims to answer the following research questions:
1. How does school management contribute to the success of model schools under the "Thai Teachers for Students in the 21st Century" program, which utilizes the Visible Learning concept to improve the quality of educational management within schools?
2. What are the features and procedures of the training program, which utilizes the Visible Learning concept to cultivate "Thai Teachers for Students in the 21st Century" and aims to improve the quality of educational management in the five southernmost provinces of Thailand? Can this program successfully develop teachers who are prepared to educate 21st-century students, and if so, how?
3. Can model schools that implement student-centered learning for 21st-century students using the Visible Learning concept through teacher learning communities enhance teachers' ability to manage learning processes that foster 21st-century skills in students? Can they improve the academic achievement and learning skills of students in these model schools, and if so, how?

Natcha Mahapoonyanont , Wipapan Phinla, Wipada Phinla,
Tharadeth Mahapoonyanont, Khanitta Jeerarat

Research Objectives

1. To extract lessons from the success of model schools in the "Thai Teachers for Students in the 21st Century" program, utilizing the Visible Learning concept, to enhance the quality of educational management in schools.

2. To develop a training program that aims to build "Thai Teachers for Students in the 21st Century" using the Visible Learning concept, with the goal of enhancing the quality of educational management in schools.

3. To create model schools that apply student-centered learning in the 21st century, utilizing the Visible Learning concept and teacher learning communities.

Background of Study

Educational institutions across the globe are placing a greater emphasis on technologies that support teacher development and enhance student-centered learning in the quickly evolving 21st century. The notion of Visible Learning was first presented by John Hattie. It is a framework that enhances learning outcomes by making learning more transparent and quantitative. This method prioritizes evidence-based pedagogical practices that significantly enhance student performance. Thailand must adopt new strategies to equip its educators and students for the exigencies of the 21st century, enhancing instructional methodologies while conforming to international educational norms.

In response to these problems, the "Thai Teachers for Students in the 21st Century" program was initiated to cultivate educators proficient in providing quality education within this swiftly evolving context. This research seeks to enhance the achievements of model schools that have successfully implemented the Visible Learning idea. By deriving insights from these schools, it is feasible to improve educational management practices nationwide.

The objective of this study is to provide a training program that uniquely prepares Thai teachers with the skills and knowledge necessary to adopt Visible Learning methodologies. To achieve this, it is essential to create teacher learning communities that emphasize collaboration, continual professional growth, and the use of student-centered learning. The establishment of model schools that embody these values would represent a thorough transformation of Thailand's educational system and ensure that both educators and students are sufficiently prepared to meet the challenges of the twenty-first century. Our study focuses on these objectives to promote enduring, high-quality teaching and learning, while simultaneously advancing the reform of the Thai educational system.

Literature Review

The context of Thai education allows for visible learning.

John Hattie's Visible Learning concept transforms education using evidence and research-based insights into what improves student learning. Hattie's seminal work, Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement (2009), reveals educational practices that effect student success, emphasizing the teacher's role. Making teaching approaches accessible to students helps them grasp learning and encourages teachers to reflect on their effectiveness.

Key Elements of Visible Learning

The Visible Learning paradigm emphasizes several key elements.

1. Teacher elucidation and comments: Hattie (2009) emphasizes that student achievement significantly improves through specific instructions, constructive feedback, and clearly defined learning objectives. Students are more capable of understanding their learning trajectory and addressing performance discrepancies when teaching intentions and feedback are clearly articulated.

2. Learning Intentions and Success Criteria: Hattie underscores the importance of students comprehending their learning objectives and the strategies necessary for achieving success. Educators facilitate student accountability for personal growth by explicitly defining learning objectives and success criteria (Hattie & Clarke, 2019).

3. Relationships between Teachers and Students: The enhancement of motivation and engagement necessitates the establishment of positive, trust-based relationships between educators and learners (Hattie, 2012). Visible Learning emphasizes the importance of relational trust in addressing students' emotional and academic needs while promoting a positive learning environment.

4. Collaborative Teacher Efficaciousness: Hattie's research indicates that effective collaboration among teachers facilitates the sharing of best practices and the enhancement of teaching methods. Collective teacher efficacy significantly impacts student outcomes by fostering professional learning communities that assess instructional effectiveness and set shared goals (Hattie, 2015).

Visible learning and 21st-century Thai education

The Visible Learning framework has clear relevance in the context of Thailand's educational reforms. Critics have criticized the Thai education system for its over-reliance on rote memorization and teacher-centered approaches, which limits the development of critical thinking and problem-solving skills. Implementing Visible Learning principles provides an opportunity to bridge traditional practices with modern, student-centered methodologies that emphasize creativity, collaboration, and communication—essential 21st-century skills.

By aligning with Thailand's goals for educational reform, Visible Learning can help shift the focus from passive learning to an active, reflective process. This is particularly relevant for the "*Thai Teachers for Students in the 21st Century*" program, which integrates Visible Learning into teacher development initiatives to foster more dynamic, evidence-based teaching practices (Hattie & Donoghue, 2016).

The success of model schools in Thailand

Several Thai model schools have adopted Visible Learning principles to create a more transparent and data-driven educational environment. These schools exemplify how making learning outcomes visible and engaging students in self-evaluation can lead to improved student performance and classroom dynamics. Key lessons from these schools include:

1. Data-Driven Instruction: Teachers utilize student performance data to inform their teaching strategies, making learning more targeted and individualized (Hattie, 2015).

2. Collaborative Learning Communities: Teachers participate in professional learning communities (PLCs), where they share experiences, reflect on practices, and collectively improve instructional methods. This collaborative model has been particularly effective in Thai schools aiming to implement Visible Learning on a broader scale (Hattie & Clarke, 2019).

3. Student-Centered Learning: These model schools emphasize student agency in the learning process, encouraging active participation and self-regulation. This shift from a teacher-centered approach to a more student-centered environment has led to increased engagement and motivation in the classroom (Hattie, 2012).

Teacher Training and Professional Development

The success of Visible Learning in Thailand is dependent on the quality of teacher professional development. A core element of this approach is building teacher efficacy and empowering educators to reflect on their teaching impacts. Programs based on Visible Learning principles offer the following benefits:

- Enhancement of Teacher Efficacy: Teachers receive training to assess the impact of their instruction using evidence-based methods and modify their strategies as necessary.
- Feedback Mechanisms: Hattie (2009) encourages teachers to use feedback not only as a tool for student growth but also for their professional improvement, fostering a reflective practice.
- Reflective Practice: A key component of professional development is encouraging teachers to reflect on their teaching practices, continuously refine their strategies, and adapt to the changing needs of their students (Hattie & Clarke, 2019).

Visible learning and the future of Thai education

The integration of Visible Learning into Thailand's educational landscape offers a promising pathway for developing teachers capable of shaping 21st-century learners. By focusing on evidence-based strategies and fostering collaborative teacher communities, the framework provides a robust model for addressing the challenges of the Thai education system. As Thailand continues to emphasize educational reform, Visible Learning's focus on feedback, student-centered learning, and professional development offers a comprehensive approach to improving educational outcomes across the country.

In conclusion, John Hattie's Visible Learning framework offers an evidence-based, research-driven approach that can profoundly impact Thai education. By aligning with the goals of the *"Thai Teachers for Students in the 21st Century"* program, Visible Learning principles provide a roadmap for developing model schools that focus on student-centered learning and collective teacher efficacy. This approach presents a significant opportunity to transform educational management in Thailand and equip Thai teachers with the skills necessary to foster critical

thinking, creativity, and collaboration among 21st-century students.

Research Framework

The research framework for this study, Visible Learning: Educational Innovation for Shaping 21st Century Thai Teachers, is grounded in the concept of Visible Learning as proposed by John Hattie (2009), which emphasizes evidence-based teaching practices that visibly enhance student learning outcomes. We specifically tailor this framework to the Thai educational context, concentrating on the training and development of teachers under the "Thai Teachers for Students in the 21st Century" program. We organize the framework around three main research objectives, guiding the exploration of how to implement Visible Learning principles to transform teaching practices and improve educational management.

1. Visible Learning as a Theoretical Foundation

Visible Learning provides a robust theoretical foundation for this research. Hattie's (2009) synthesis of over 800 meta-analyses identified key teaching strategies that significantly impact student achievement. Central to Visible Learning is the idea that teachers must develop an understanding of the effectiveness of their instructional practices and their impact on student outcomes. The research framework explores the application of this concept in Thai educational settings, encouraging teachers to adopt evidence-based approaches that foster deep learning and critical thinking skills in students.

2. Success of Model Schools in the "Thai Teachers for Students in the 21st Century" Program

 The first objective of the study is to extract lessons learned from the success of model schools in the "Thai Teachers for Students in the 21st Century" program. Model schools, which have already implemented the Visible Learning approach, provide a valuable case study for understanding how these practices enhance the quality of educational management. The research framework examines how factors such as teacher collaboration, leadership, and professional development contribute to creating effective learning environments that align with 21st-century learning demands. The framework also considers the impact of teacher learning communities in sustaining innovation.

3. The development of a training program for Thai teachers

The framework directs the creation of a comprehensive training program that cultivates "Thai Teachers for Students in the 21st Century," in order to address the second research objective. This program will be based on the Visible Learning model, with an emphasis on fostering teachers' ability to critically reflect on their practices, assess their impact on student learning, and apply strategies that promote student engagement and achievement. The training will also incorporate components related to professional learning communities, collaborative inquiry, and continuous feedback to ensure sustainable improvement in educational management.

4. The establishment of model schools focused on student-centered learning

The third objective focuses on establishing model schools that apply student-centered learning approaches in line with 21st-century education goals. The framework highlights the integration of Visible Learning strategies with teacher-led initiatives aimed at creating active, student-centered classrooms. Key elements of this framework include collaborative lesson planning, peer observations, and the use of data to inform teaching practices. These schools will serve as benchmarks for scaling up successful Visible Learning practices across the country.

The research framework for this study provides a comprehensive approach to exploring the impact of Visible Learning on the development of Thai teachers and educational management practices. By focusing on model schools, teacher training, and the creation of student-centered learning environments, this framework aims to contribute to the broader goal of shaping 21st-century Thai education.

Methodology

This research is divided into three phases as follows:

1. Extracting lessons from the success of model schools in developing learners through the Visible Learning concept.

2. Developing a training program to create Thai teachers for the 21st century using the Visible Learning concept, with the aim of enhancing the quality of educational management in schools under the jurisdiction of Songkhla Primary Educational Service Area Office 1.

3. Conducting research to develop model schools that implement 21st-century student-centered learning, using the Visible Learning concept, to improve the quality of educational management in schools under the jurisdiction of Songkhla Primary Educational Service Area Office 1.

Natcha Mahapoonyanont , Wipapan Phinla, Wipada Phinla,
Tharadeth Mahapoonyanont, Khanitta Jeerarat

The research methodology is as follows:

1. The first phase of the study aims to examine the success lessons from model schools in the "Thai Teachers for Students in the 21st Century" program, utilizing the Visible Learning concept to enhance the quality of educational management. The research design employs qualitative methods to gather comprehensive insights into the implementation of Visible Learning in model schools. The primary data collection methods include in-depth interviews with school administrators, teachers, and students, documentary analysis of reports and assessments, and classroom observations to evaluate teaching practices and student engagement. Lamplaimat Pattana School serves as the unit to extract lessons learned from successful school management and a sample of 16 experts from all over Thailand, all of whom have significant educational experience. The research process begins with a literature review, followed by structured data collection through interviews, document reviews, and observations. We use a structured interview guide as the primary tool to ensure comprehensive responses from participants. We conduct data analysis using a content analysis approach, identifying recurring themes to explain the success of Visible Learning. Informed consent and maintaining confidentiality are ethical considerations, and member checking and triangulation techniques ensure trustworthiness.

2. The second phase of the study focused on developing a training program for Thai teachers using the Visible Learning concept to improve educational management in schools located in the five southern border provinces of Thailand. Here's an outline of the research methodology:

2.1 We identified the essential components for developing the training program in the needs analysis step. We conducted a focus group with 14 participants, including university faculty, school directors, education supervisors, and teachers, to assess training needs.

2.2 Training Program Development:

    1) The researcher defined the training framework based on a review of relevant literature and collaboration with curriculum experts. The researcher aligned the core concept with the Visible Learning approach.

    2) Teachers collaborated to further refine the framework, which involved systematic document reviews and tool design, including the training package and its manual.

    3) We verified the validity and alignment of the training program.

2.3 We implemented the developed training program with 30 voluntary teachers from schools in the five provinces during the pilot test. The pilot involved pre-training assessments, weekly meetings, workshops, classroom visits, and post-training evaluations. Continuous feedback from teachers helped refine the program.

2.4 Evaluation: Teachers' understanding of Visible Learning, teaching competencies, student learning outcomes, and teacher satisfaction served as indicators of the program's effectiveness.

3. The last phase aims to develop model schools that implement student-centered learning in the 21st century through the Visible Learning concept using teacher learning communities (PLCs). We divide the research methodology into five key steps:

3.1 Identifying External Variables and Needs Assessment: The first step involved assessing the needs for developing model schools to enhance the quality of education within the Songkhla Primary Educational Service Area, Zone 1. This included interviews with 17 experts, such as school principals, education quality trainers, supervisors, and teachers.

3.2 We collaborated with educational personnel and experts to create a conceptual framework for developing model schools. This included designing research tools, such as a manual for school management and teacher operations following the Visible Learning concept.

3.3 We evaluated the suitability and feasibility of the framework to ensure its alignment with the educational context and objectives.

3.4 Implementation of Model School Development: This stage focused on establishing a teacher learning community (PLC) within a selected school. The project involved one-day knowledge-sharing sessions with teachers and administrators, followed by the implementation of Visible Learning principles, incorporating five core practices: shared vision, collective focus on student learning, collaboration, deprivated practice, and reflective dialogue.

1. Research Findings

**Natcha Mahapoonyanont , Wipapan Phinla, Wipada Phinla,
Tharadeth Mahapoonyanont, Khanitta Jeerarat**

1. Research Findings on the Success of Model Schools Using the Visible Learning Concept

An in-depth interview study conducted at Lamplaimat Pattana School revealed valuable insights from the success of model schools in the "Thai Teachers for Students in the 21st Century" program. This research utilized John Hattie's Visible Learning concept to enhance educational management. Seventeen participants, including school administrators, educational supervisors, and teachers, contributed to the study.

The findings highlighted that the Visible Learning approach, which focuses on making teaching and learning visible to both teachers and students, includes essential elements such as effective feedback, explicit teaching, student self-assessment, and clear learning objectives. These elements, when adapted in Thai schools, have been supported by teacher professional development through Professional Learning Communities (PLCs), mentoring programs, action research, and the integration of technology in the learning process.

Key outcomes of the Visible Learning application include improved student engagement, which led to better content comprehension and enhanced analytical thinking. Aligning assessments and evaluations with the Visible Learning framework was identified as crucial for effective teaching. Furthermore, Thai model schools saw improvements in student achievement, self-directed learning, collaboration between teachers and students, and a reduction in educational disparities.

The study emphasized the importance of ongoing teacher training and professional development, particularly in Visible Learning and effective assessment practices. It also recommended that curriculum design should remain flexible and responsive to assessment results. The integration of technology in teaching and assessment processes is critical, and fostering a learning culture where students actively participate in decision-making and express their creativity is vital for success. Moreover, comprehensive assessment systems are essential to improving the overall quality of educational management.

2. Results of Teacher Training Program Development

In the 2023 academic year, 30 voluntary participants from educational institutions in Thailand's five southern border provinces engaged in a teacher training program designed to develop "Thai Teachers for Students in the 21st Century." This program utilized the Visible Learning concept to improve educational management quality within the Songkhla Primary Educational Service Area 1. The evaluation of the program yielded the following results:

1. **Effectiveness Ratio**: The program achieved an effectiveness ratio of 84.54/87.33, which exceeded the set criteria, demonstrating that the training successfully met its objectives.

2. **Pre- and Post-Training Performance**: Participants demonstrated a marked improvement in their knowledge and skills as reflected in pre- and post-training assessment scores. The average pre-training score was 4.73, while the post-training score rose significantly to 8.03. This improvement was accompanied by a reduced standard deviation, indicating more consistent development among participants. A t-test analysis confirmed that this difference was statistically significant at the 0.001 level ($p < 0.001$).

3. **Participant Satisfaction**: Overall, participants reported high satisfaction across various aspects of the training program. The highest levels of satisfaction were related to the participation and activities during the training, which received a score of 4.60. Other areas of high satisfaction included the clarity of training content (4.50), post-training support and follow-up (4.40), the anticipated positive impact on improving educational management quality (4.30), and the application of the Visible Learning concept (4.20).

These findings indicate that the training program was successful not only in enhancing the skills and knowledge of participants but also in achieving high levels of participant satisfaction. Moreover, the significant improvement

in post-training scores highlights the program's effectiveness in developing educators capable of applying the Visible Learning framework to improve educational management in their respective schools.

3. Development of Model Schools Using the Visible Learning Concept with PLCs

The results are highlighted several essential factors for developing model schools that incorporate 21st-century, student-centered learning through the Visible Learning framework. Key elements identified include building teacher capacity through ongoing training and Professional Learning Communities (PLCs), providing modern educational resources, ensuring effective management, securing administrative support, engaging the community and parents, and adopting a data-driven approach to school development.

Researchers found that the Visible Learning framework significantly enhances 21st-century learning by focusing on clear, objective assessments and fostering a student-centered approach. Collaboration between researchers and educational personnel was instrumental in successfully developing model schools in Songkhla Primary Educational Service Area 1. These schools utilized tools aligned with the Visible Learning framework, which were crucial in supporting effective teaching and learning.

The Visible Learning framework requires model schools to thrive by emphasizing the use of measurable teaching strategies. Posing questions that stimulate analytical thinking and setting learning goals closely linked to real-life applications are among these strategies. Ongoing monitoring and evaluation are essential to continually improve student learning outcomes.

The support of school administrators and teachers played a critical role in the project's success. The feasibility assessment for developing model schools in Songkhla Primary Educational Service Area 1 found that the Visible Learning framework was not only well-received but also strongly supported by school leaders and educators. The establishment of PLCs, which focused on teacher training and professional development aligned with the Visible Learning concept, drove the highly successful implementation in sample schools. The study concluded that the Visible Learning approach allows schools to present clear, structured, and continuously improving learning processes, resulting in better student outcomes and enhanced educational management.

2. Conclusion

The implementation of John Hattie's Visible Learning concept in Thai model schools has demonstrated significant potential in improving educational outcomes, particularly through making teaching and learning processes more transparent to both teachers and students. The results from Lamplaimat Pattana School, along with the creation of a teacher training program and model schools in the Songkhla Primary Educational Service Area, have shown how important it is to use technology, give students clear feedback, and keep them interested in learning in order to help them understand what they are being taught better.

The significant improvement in participant performance and high satisfaction rates, demonstrating the success of the teacher training program, underscores the effectiveness of professional development strategies aligned with the Visible Learning framework. This program not only increased teachers' capacity to apply innovative teaching methods but also promoted a collaborative learning culture through Professional Learning Communities (PLCs).

Moreover, the development of model schools using the Visible Learning approach has shown that continuous monitoring, evaluation, and administrative support are critical to sustaining improvements in educational management and student outcomes. These schools have successfully adopted student-centered learning methods and emphasized real-life applications of knowledge, leading to improved student achievement, analytical thinking skills, and reduced educational disparities.

Overall, this research affirms the value of the Visible Learning framework in enhancing the quality of education in Thailand. It highlights the necessity for ongoing teacher training, flexible curriculum design, and comprehensive assessment systems that respond to student needs. By fostering a learning environment **that encourages student** participation and creativity, Thai schools are better equipped to prepare students for the challenges of the 21st

century.

Discussion

The findings from this study provide valuable insights into the successful application of the Visible Learning concept within Thai schools, particularly through the development of model schools in the "Thai Teachers for Students in the 21st Century" program. By making the teaching and learning process visible to both teachers and students, the Visible Learning approach significantly enhances educational outcomes. The emphasis on effective feedback, explicit teaching, student self-assessment, and the clarity of learning objectives has proven essential for fostering student engagement, deepening content comprehension, and cultivating analytical thinking.

One of the most critical aspects of this study was the application of Professional Learning Communities (PLCs) to support ongoing teacher development. As demonstrated in the research, PLCs, mentoring programs, and action research were instrumental in equipping teachers with the skills necessary to adapt the Visible Learning framework effectively. This ongoing professional development aligns with existing literature that highlights the importance of sustained teacher learning communities in improving educational practices (Hattie, 2009).

The development of a comprehensive teacher training program further underscores the importance of Visible Learning in improving educational management. The statistically significant improvement in participants' post-training performance, along with the high levels of participant satisfaction, confirms the efficacy of the training in equipping educators with the tools and strategies necessary for applying Visible Learning in the classroom. These findings echo similar results from studies on teacher professional development, which emphasize the role of targeted training in enhancing both teacher and student outcomes (Timperley et al., 2007).

The implementation of Visible Learning in model schools also highlights the importance of aligning assessments with learning goals and feedback mechanisms. As revealed in the study, student-centered learning approaches, combined with clear and measurable teaching strategies, foster an environment conducive to self-directed learning and collaborative teacher-student relationships. This aligns with global best practices in education, where student engagement and the personalization of learning are considered key drivers of academic success (OECD, 2019).

Another significant outcome of the study is the reduction of educational disparities through the Visible Learning framework. The ability of model schools to present structured, visible learning processes that continuously improve through feedback and reflection suggests that Visible Learning offers a pathway toward more equitable education. The data-driven development and community involvement observed in these model schools further support this, as they provide essential resources and administrative support for effective implementation.

The success of the teacher training program and the development of model schools in Songkhla Primary Educational Service Area 1 indicate that Visible Learning is a feasible and effective framework for enhancing educational management quality. The strong support from school administrators, teachers, and community stakeholders points to a sustainable model for continued development.

Recommendations for Future Research

While this study offers a robust framework for implementing Visible Learning in Thai schools, further research is needed to explore long-term outcomes across a broader range of educational settings. Additionally, the role of technology in augmenting Visible Learning, especially in areas with limited access to digital resources, warrants deeper investigation. As the global educational landscape evolves, continuous research on teacher professional development and student engagement will be essential to maintaining the relevance and efficacy of the Visible Learning framework.

Based on the research findings, the application of Visible Learning in Thai schools has led to improvements in learning management, assessment, student engagement, and teacher development. Key recommendations for stakeholders are:

1. Ministry of Education

• Policy and Teacher Development: Adopt the Visible Learning framework in national teacher training programs, focusing on visible learning processes and effective assessment.

• Technology in Teaching: Support the integration of technology in teaching and assessment for clarity and standardization.

• Action Research: Promote school-based action research to address diverse educational needs.

2. Office of the Basic Education Commission (OBEC)

- Model Schools Development: Support the creation of model schools using Visible Learning, facilitated by Professional Learning communities (PLCs).
- Expansion of Visible Learning: Encourage schools nationwide to adopt the framework, especially in areas with educational challenges.
- Assessment Tools: Develop assessment systems aligned with Visible Learning to track student outcomes.

3. Educational Service Area Offices

- Teacher Training: Provide training on visible learning and assessments to enhance teaching practices.
- Learning Communities: Encourage PLCs to foster collaboration and continuous improvement among teachers.

4. Faculty of Education, Thaksin University

- Curriculum Enhancement: Use the research to update teacher education programs, focusing on 21st-century teaching skills.
- Research Continuation: Support ongoing research, particularly in action research specific to school contexts.

5. Model and General Schools

- Visible Learning Application: Schools should apply Visible Learning to improve teaching, assessment, and student outcomes.
- Student-Centered Environment: Foster environments that encourage student participation and critical thinking.

6. Institute for the Development of Teachers (DIPTEP)

- Teacher Training Programs: Design training programs based on Visible Learning and effective assessment practices for 21st-century teaching.
- Continuous Development: Provide ongoing training to strengthen teaching and assessment aligned with current educational needs.

7. School administrators and parents

- Support Visible Learning: School leaders should prioritize the implementation of Visible Learning and monitor its impact on learning outcomes.
- Parental Involvement: Encourage collaboration between parents, teachers, and schools to support student skill development.

Acknowledgement

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Natcha Mahapoonyanont , Wipapan Phinla, Wipada Phinla,
Tharadeth Mahapoonyanont, Khanitta Jeerarat

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